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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

GUGLIOTTA, NICOLE T

ART UNIT	PAPER NUMBER
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1783

NOTIFICATION DATE	DELIVERY MODE
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05/26/2010

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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Office Action Summary	Application No. 10/533,879	Applicant(s) PONCET-LEGRAND ET AL.	
	Examiner NICOLE T. GUGLIOTTA	Art Unit 1783	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 February 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 3 - 39 is/are pending in the application.
- 4a) Of the above claim(s) 15 - 38 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 3 - 14 & 39 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Examiner's Note

Examiner acknowledges the amendment of claim 1 and the cancellation of claims 2. Claims 15 - 38 have been withdrawn. Claims 1, 3 - 14 & 39 are presently examined. Examiner confirms no new matter has been added.

Claim Rejections - 35 USC § 103

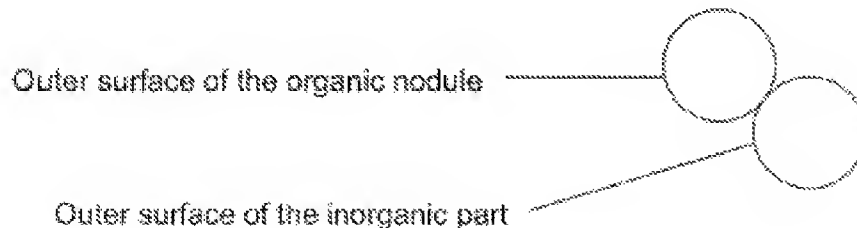
The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1, 3 - 12 & 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xia et al. (*J. Am. Chem. Soc.* 2001, 123, 771 - 772), in view of Reculosa et al. (*Chem. Mater.* 2002, 14, 2354 - 2359).

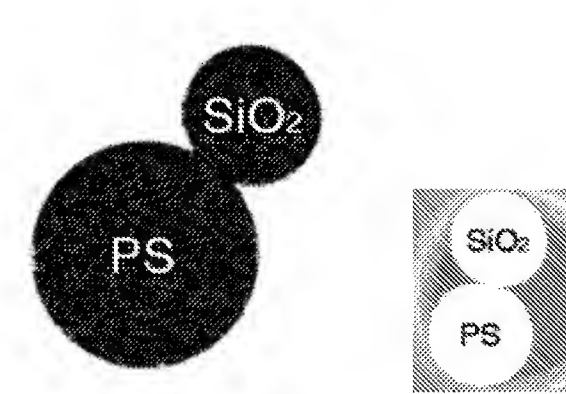
APPLICANT'S INVENTION (drawing taken from Applicant's Remarks, pg 14, dated July 16, 2009)

Claimed Particles



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PRIOR ART (Xia et al., Figures 2c and 3; wherein PS is a polystyrene organic nodule and SiO₂ is the inorganic part of the particle)



In regard to claims 1, 3, 10 & 14, Xia et al. disclose an asymmetric dimer comprising spherical silica and spherical polystyrene (Figure 2, pg 772, left column of text).

Xia et al. disclose part sizes greater than 1 micron, which is larger than the size of the entire particle claimed by Applicant. However, Xia et al. teach the size of the polymer beads can be changed and the overall scale can be much smaller than the examples given (pg 772, last paragraph).

Reculusa et al. also disclose particles for use in paints, gas-liquid chromatography and catalyst supports (pg 2354, right column, last 3 lines of last paragraph) consisting of 2 parts: spherical silica particles and spherical polystyrene nodules (pg 2354, second column first paragraph). The silica (inorganic) part of the particles disclosed by Reculusa et al. have an approximate diameter of 500 nm (Pg 2356, right columns, first paragraph) and each

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polystyrene nodule has a diameter of 200 nm (pg 2357, right column, bottom of the third paragraph).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to adjust the size of the polystyrene beads and silica colloids in the asymmetric dimers disclosed by Xia et al. to optimize the particles size according to the intended use, as Reculosa et al. teach there are a wide variety of uses for particles consisting of silica carriers and polystyrene nodules.

In addition, Xia et al. joined the polystyrene nodule and silica colloid by the application of heat alone, thus failing to teach a coupling agent between silica colloids and polystyrene beads in the asymmetric dimer of their invention.

However, Reculosa et al. disclose the silica surface can be modified to allow anchoring of the polymers. In the past, this was achieved by grafting alkoxysilane to the silica surface (pg 2355, Col. 1, Lines 14 - 18). Examiner considers alkoxysilane modification on the silica surface to be a "coupling agent" (claims 1, 5 & 6). Reculosa et al. also describe the method of joining silica with polystyrene via a silane coupling agent, as previously taught by Tissot et al. (Pg 2354, Col. 2, Lines 4 - 5). Reculosa et al. adsorbed hydrophilic PEG methacrylate macromonomer, an initiator and a surfactant as the coupling agents of choice, in addition to heat, for joining the polystyrene nodules to the silica colloid (Pg. 2355, Col. 2, last paragraph; Pg 2357, Col. 2, 2nd full paragraph & Fig. 4). This method results in a strong attachment of polystyrene nodules of 200 nm diameter to the silica surface (Pg 2357, Col. 2, 3rd full paragraph).

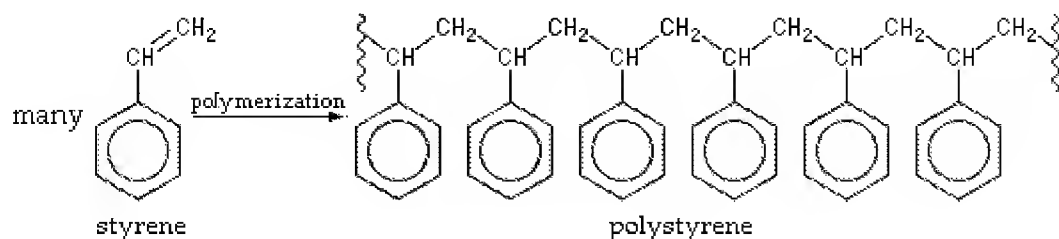
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Reculusa et al. further teach the presence of macromonomer is a vital component to forming the smaller polystyrene nodules desired (Pg. 2358, Col. 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to form a strong attachment between polystyrene nodules and silica colloids by modifying the method disclosed by Xia et al. with the addition of coupling agents, such as PEG methacrylate macromonomer. Reculusa et al. teach the presence of the PEG methacrylate macromonomer is a vital component for obtaining the desired nanometer sized polystyrene particles.

In regard to claim 4, as discussed above for claims 1 and 3, Xia et al. disclose the inorganic material is silica (silicon dioxide). Silicon is a metal. When silicon is in the form of silica, it is stable in an aqueous medium.

In regard to claims 7 – 8, Xia et al. disclose polystyrene as the organic part of their asymmetric dimer. Polystyrene polymer comprises recurrent units of $-\text{CR} = \text{CR}'-$, wherein R represents H and R' represents the alkyl group of a phenyl ring, as shown below. The phenyl ring is an aromatic group (comprises resonating double bonds) and is thus a functional group.



In regard to claim 9, Xia et al. and Reculusa et al. are both silent in regard to cross-linking. However, any polymer nodule contains cross-linking or it

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doesn't. Therefore, regardless the absence of an explicit disclosure by the references, the polystyrene nodules disclosed by both Xia et al. and Reculosa et al. are crosslinked or noncrosslinked.

In regard to claim 11, Xia et al. disclose in Figure 3 asymmetric dimers, each comprising a silica ball of 2.3 μm and a polystyrene bead of 2.5 μm , thereby forming a dimer resembling a dumbbell shape.

In regard to claim 12, Xia et al. disclose asymmetric dimers that have the shape of a snowman in Figures 2(A) - 2(D), pg 772, left column of text, half way down the column).

2. Claims 13 & 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xia et al., Reculosa et al., and as applied to claim 1 above, and further in view of Yadav et al. (US 2003/0102099 A1).

In regard to claim 13, Xia et al. & Reculosa et al. are silent in regard to the various shapes the inorganic particle may have.

Yadav et al., however, disclose nano-dispersed powders used in paints and catalyst supports (§ [0011]), comprising carrier particles (i.e. silica) (§ [0053]) and a dispersed particle attach to the carrier particle, such as a polymer (§ [0054]). The inorganic particle (i.e. silica) can be in the shape of spheres, tubes (corresponds to Applicant's "rod", platelets (corresponds to Applicant's "disk") & irregular shaped structures (Figure 2, § [0043]).

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Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention for the inorganic particle to be shaped according to its desired application, as disclosed by Yadav et al.

In regard to claim 39, Xia et al. and Reculosa et al. fail to disclose particle parts in the range of 50 nm to 250 nm.

Yadav et al., however, disclose nano-dispersed powders used in paints and catalyst supports (§ [0011]), comprising carrier particles (i.e. silica) (§ [0053]) and a dispersed particle attach to the carrier particle, such as a polymer (§ [0054]). These powders (i.e. particles) are preferably less than 100 nm is size (sub-micron and nanoscale) (§ [0009]) because these particles are the building blocks for desirably smaller products (§ [0004]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the size of the particles disclosed by Xia et al. (and Reculosa et al.) to less than 100 nm in order to build smaller products, which would satisfy the demands of the markets for smaller products, as taught by Yadav et al.

Response to Arguments

3. Applicant argues, "The claimed subject-matter differs from the disclosure of Xia in that the claimed dissymmetric particle has a size of at most 1 um, and the two parts of the particle are coupled therebetween by a coupling agent, which is adsorbed or covalently grafted to the surface of the first part"

“Reculusa et al. disclose raspberrylike silica/polystyrene materials, i.e., symmetric particles. As shown in Figure 4, the synthesis of this material involves the absorption of macromonomer chains on the silica particle, each macromonomer chain being aimed to react with the monomer during the polymerization, so as to provide a silica particle carrying a plurality of polystyrene nodules.

“In contrast, the particles of the instant claims are dissymmetric and comprise a single nodule of organic material, which is coupled to an inorganic part” (Remarks, Pg 12).

EXAMINER’S RESPONSE: In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

4. Applicant argues, “It would have not been obvious for a skilled person to combine the teaching of Xia et al. with the teaching of Reculusa et al. The two methods concern different modes of production for particles having different shapes and different composition (with or without coupling).”

“Even if Reculusa et al. were properly deemed to suggest the use of coupling agents for coupling polystyrene nodules to a silica particle, Reculusa et al. do not disclose or suggest how to couple a single nodule of polystyrene to a silica particle to form a dissymmetric particle.

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“Indeed, Reculosa et al. is concerned exclusively with symmetric particles. Moreover, as taught by Reculosa et al., the surface of the silica particle should be saturated with the macromonomer chains so as to provide said particle with a plurality of polystyrene nodules” (Remarks, Pg 13).

EXAMINER’S RESPONSE: Applicant’s arguments have been fully considered but they are not persuasive. There is no suggestion by Reculosa et al. that the method of using a coupling agent can not be used for joining a single polystyrene nodule to a single silica particle. In fact, it would have been obvious to one of ordinary skill in the art at the time of the invention that if a plurality of nodules can be added to a silica surface, than a single nodule can be added to a silica surface simply by adding only one macromonomer chain to the silica surface for polymerization.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory

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action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NICOLE T. GUGLIOTTA whose telephone number is (571)270-1552. The examiner can normally be reached on M - F 8:30 a.m. - 6 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David R. Sample can be reached on 571-272-1376. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

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/David R. Sample/
Supervisory Patent Examiner, Art Unit 1783

/NICOLE T GUGLIOTTA/
Examiner, Art Unit 1783